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PESTICIDES SAFELY BY AIRCRAFT

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APPLY PESTICIDES SAFELY BY AIRCRAFT

Opportunities for aerial applicators to apply pesticides safely have been increased by improvements in chemicals, equipment, and training.

A variety of effective pesticides can be applied by aircraft in more easily controlled formulations. Dispersal apparatus has been improved and aircraft have become more versatile and useful. Pilots are better trained.

By utilizing these improvements, the safety conscious aerial applicator can apply pesticides effectively without hazard to his pilots and crew, clients, and the interests of the community.

The Pilot is the Key

Safe pilots are well trained and up to date on new developments. They know when and where to apply pesticides and the harm that can be done if they apply pesticides carelessly. They know their dispersal equipment--how to maintain and use it. They know the flight characteristics and load limitations of their planes.

Most large aerial application firms provide continuous training for their pilots. Lone operators or small companies unable to provide such training can avail themselves of needed training through short courses offered by some agricultural colleges.

Selecting the Pesticide

Select the safest, least persistent pesticide that will do an effective job. When there is a choice, use spray instead of dust to reduce the possibility of drift. Also, make sure the pesticide has been cleared for the crop or area intended.

Pesticide labels are your guide. The labels of all pesticides moving in interstate commerce are registered by USDA and contain information on effective use of the pesticide. They also contain safety precautions; for example, most labels stipulate the time interval between treatments and harvest.

Proper Equipment Necessary

Dispersal apparatus recommended for the job is necessary if you are to apply pesticides safely and effectively. Here are some recommendations:

- Limit the boom length to $3/4$ of the wing span so that spray will not be emitted near the wingtip. If this happens, the spray is picked up by the wingtip vortices and may drift outside the treatment area.
- Select nozzles that produce the recommended droplet size. Use droplets as large as practicable to avoid drift.
- Use leakproof "on-off" valve. A valve that incorporates the suckback feature, or a pressure bleed line, reduces the risk of dribbling nozzles or other boom leakage.

Keep Equipment in Top Condition

The best equipment won't do the job if it is not in top condition. Here are some things to do:

- Change nozzle tips or disks when orifices become worn so that calibration will remain accurate.
- Clean check valves and change diaphragms frequently and at regular intervals.
- Keep a close check for any sign of leakage. Change any hose that is eroded, swollen, or cracked. Use chemical-resistant hoses and pump packing.

Before the Take-Off

Study each situation carefully before starting a job and apply pesticides only when they are needed.

Do not treat a field if it is too small for the aircraft or there are too many obstructions around the field to permit effective treatment by aircraft. Also, refuse to fly if the customer insists on having his work done at a time or in a manner that may create hazards from improper chemical application.

Delay application if wind makes it impossible to control the spray or the temperature is such that the pesticide will not settle to the ground within the treatment area. Stop treating immediately if rising wind creates a drift hazard or affects accurate placement of the pesticide.

Make sure that workers are out of the field before you start a job. Also, warn customers not to allow people or livestock to enter the treated area before it is safe to do so.

Advise other residents near the treatment area about any precautions they may need to take before, during, or after the treatment.

Calibrate dispersal apparatus precisely and keep a constant check on calibration so that material will be distributed uniformly and in the correct amount. If flow rates are changed by temperature, humidity, diluents, additives, or other factors, calibration must be modified accordingly.

Where possible and practicable, use flagmen to guide the aircraft in the treatment area to insure accurate swath spacing and more accurate application.

Once in the Air

Avoid pesticide drift onto homes, barns, communities, streams, lakes, ponds, pastures, or crops grown for food, hay, or silage. Fly swath runs parallel to these areas and avoid turns over them when practicable.

Do not turn on dispersal apparatus except in treatment areas. Do not prime dispersal equipment or check the flow rate on the way to the treatment area.

After completing a job, do not "dump" pesticide remaining in the aircraft on the way back to the airstrip. Instead, return to the airstrip, drain the unused pesticide into a properly marked container, and store it in a safe place. If you must dispose of excess pesticide or spray mixture, bury it at least 18 inches at a safe disposal site.

Handling Pesticides Carefully

Keep pesticides and pesticide containers in a separate building or enclosure. Use this storage area exclusively for pesticides and empty pesticide containers. (Note: Do not keep insecticides and weedkillers in the same area.) Buildings or rooms used for pesticide storage should be dry, ventilated, and under lock and key. Outside storage areas should be fenced in to protect children and animals and to discourage pilferage.

Remove only the amount of pesticides needed for one day's operation and be sure to return empty containers--and any unused pesticide--to the storage area at the end of each day. Keep lids tightly closed on all containers at all times except when they are actually in use.

Be especially careful when mixing pesticides. If crewmen draw water from streams or ponds, make sure that none of the pesticide flows into the water source. If any pesticide is spilled, take steps to clean it up or otherwise protect persons and animals from harm. On a hardsurfaced area, hosing the spot thoroughly with water will reduce the hazard. Cover pesticide spilled on the ground with dirt. Be sure to fence off the area until protective measures can be taken.

Clean aircraft and spray equipment daily so that residue does not accumulate. Clean aircraft in an area where the drainage will soak into the ground. Do not allow the drainage to run into a city sewer, ditch, pond, or stream.

Personal Safety of Operators

Persons working closely with pesticides--especially pilots, mixers, and loaders--should be reminded often of their personal safety.

They should take blood tests to establish cholinesterase levels before working with organic phosphate pesticides and at weekly intervals as long as the work is continued. When a test shows that the cholinesterase level is becoming critical they should get away from the pesticides even if there's just "one more load to go."

Crews and pilots should learn to recognize symptoms of pesticide poisoning and should know what to do in the event of overexposure. Crew members should observe each other carefully for any change in their normal manner or action. Any abnormal action may indicate the onset of pesticide poisoning.

Here are some other suggestions for pilots and crew members:

- Ground crews should wear protective clothing, gloves, and respirators when handling materials that require it. If a respirator is required, it should be the type that will protect against the particular spray being used. Information on respiratory protective equipment is contained in ARS 33-76, "Respiratory Devices for Protection Against Certain Pesticides." You can obtain the publication from the Entomology Research Division, Agricultural Research Service, Beltsville, Md., 20705.
- Persons working closely with or handling pesticides should change clothing and bathe at the end of the operation, or immediately if pesticide gets on the skin. Work clothes should be washed daily.

- Pilots should never fly through the cloud of spray or dust they put out in previous passes over the field.
- Pilots should not assist in mixing or loading organic phosphates.



Protective clothing helps avoid over-exposure to pesticides.

Disposing of Empty Containers

Never abandon empty containers at the completion of a job. Pesticide residue remaining in these containers is a hazard to children, pets and livestock, and to adults who convert the containers to other uses. In certain areas, empty containers can also result in water pollution.

Empty containers of all types can be disposed of safely at public dumps, incinerators, or private disposal sites. Large metal drums can be disposed of most safely and easily by returning them to the supplier or selling them to a cooperage firm equipped to handle toxic materials.

Regardless of the disposal system you follow, however, you can lessen the amount of hazard by:

- Draining any pesticide remaining in the container into a pit dug in sandy soil.
- Rinsing glass and smaller metal containers several times with the diluent being used and including the rinse in your spray.
- Keeping lids and bungs tightened at all times when containers are not being used.

- Keeping all empty containers in a secure storage area until they can be disposed of safely.

Here are procedures to follow with various disposal methods:

Mutilate containers so they cannot be re-used.



Public Dump or Incinerator

Notify operator of dump or incinerator of the nature of the material so he will be able to take any necessary precautions. Break glass containers. Chop holes in top, bottom, and sides of metal containers using a sharpened pickaxe. Mutilating these containers will make it less likely that they will be removed from the dump and re-used. Containers should be buried, even at the public dump.

Private Disposal Site

If public disposal facilities are not available and containers cannot be turned over to a cooperage firm, select a disposal site away from streams, homes, and cropland. Try to find a depressed area with no drainage outlet. In such an area residue will be absorbed through the soil rather than carried away in water run-off. Do not dispose of containers near the watershed of a public water supply.

Paper bags, cardboard boxes, and plastic containers should be burned at a private disposal site after making sure that smoke will not drift over nearby homes, people, livestock, and the person doing the burning.

(Note: Containers that held weedkillers should not be burned. See page 8 for suggestions on how to dispose of these containers.)

Where economical sources of fuel are available, metal and glass containers can also be decontaminated by burning. After removing lids, use a sharpened pickaxe to chop holes in top, bottom, and sides of

metal containers. Build a pyre or combustible heap from scrap wood, dry brush, old automobile tires, or anything that will make a hot fire. Then place containers on the pyre and start the fire. Heat containers until they are red hot and hold them at that temperature (800 to 1200 degrees F.) for at least 5 minutes.

If burning is not possible, a thorough rinsing procedure will eliminate much of the pesticide residue and hazard. Here is the recommended rinsing procedure:

1. Carefully rinse empty container with water and detergent. (See table below.) Allow water and detergent to remain in the container for 15 minutes with intermittent agitation. Pour rinsing into a pit dug in sandy soil.
2. Re-rinse container for another 15 minutes with the same amount of water and detergent. Again pour rinse solution into the pit. Invert container and let it drain for 15 minutes into the pit.
3. Flush drum thoroughly with clean water.

<u>Container Size</u>	<u>Water</u>	<u>Detergent</u>
5 gals.	2 quarts	2 tbsp.
30 gals.	3 gals.	1/2 cup
55 gals.	5 gals.	1 cup

CAUTION: Although they may appear to be completely free of residue, these containers must not be used for storing human or animal food or water!

Supplier or Cooperage Firm

Tighten all bungs, rinse drums off with water, and keep the drums in the storage area until they are picked up.

Disposing of Weedkiller Containers

Use a sharpened pickaxe to chop holes in top, bottom, and side of metal containers and break glass containers so they cannot be re-used or collect water. Bury all weedkiller containers to a depth of 18 inches or take them to a dump where they will be covered with soil.

CAUTION: If pesticides are handled or applied improperly, or if unused parts are disposed of improperly, they may be injurious to humans, domestic animals, desirable plants, pollinating insects, fish or other wildlife, and may contaminate water supplies. Use pesticides only when needed and handle them with care. Follow the directions and heed all precautions on the container labels.

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